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AHA/ASA-Endorsed Practice Guidelines

Management of Adult Stroke Rehabilitation Care

A Clinical Practice Guideline*

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J-2. Adaptive Equipment, Durable Medical Equipment Devices, Orthotics, and Wheelchairs

Background

Many patients require assistive devices, adaptive equipment, mobility aids, wheelchairs, and orthoses to maximize independent functioning after stroke. Many types of adaptive devices and durable medical equipment devices are available. Type and level of functional deficit, degree of achieved adaptation, and the structural characteristics of the living environment determine the need for a particular item.

Recommendations

1. Recommend that adaptive devices be used for safety and function if other methods of performing the task are not available or cannot be learned or if the patient's safety is a concern.
2. Recommend that lower-extremity orthotic devices be considered if ankle or knee stabilization is needed to improve the patient's gait and prevent falls.
3. Recommend that a prefabricated brace be initially used and that only patients who demonstrate long-term need for bracing have customized orthoses made.
4. Recommend that wheelchair prescriptions be based on careful assessment of the patient and the environment in which the wheelchair will be used.
5. Recommend that walking assistive devices be used to help with mobility efficiency and safety, when needed.

Discussion

A vast array of adaptive devices is available, including devices to make eating, bathing, grooming, and dressing easier for patients with functional limitations. These devices

should only serve as a supplement and should not be expected to take the place of the patient mastering the task in question. Additionally, many patients may need to use adaptive devices early during the rehabilitation after a stroke, but will not require long-term use. This should be taken into account when considering providing a device. Examples of adaptive devices include (but are not limited to) eating utensils with built-up handles, rocker knives, plate guards, nonskid place mats, long handled sponges for bathing, hand-held showers, tub and shower chairs, grab bars for bathrooms, and elevated toilet seats.

Lower-extremity orthoses, such as ankle-foot-orthoses and knee-ankle foot-orthoses, may be required if the patient has persistent weakness and instability at the ankle and/or knee joint after a stroke. Proper timing for using an orthosis can facilitate gait training and should be considered early on in the rehabilitation process to permit gait training to occur as early as possible. An orthosis should not be used as a substitute for functional exercise directed at regaining muscle strength and control, particularly if the prognosis for motor recovery is good. Prefabricated orthoses can be used in the early stages of gait training, but a custom-fit device should be provided if it is determined that the patient may require long-term use of the orthosis.

Spasticity

BACKGROUND.

Contractures that restrict movement of the involved joint or are painful will impede rehabilitation and may limit a patient's potential for recovery. Patients with paretic limbs with muscle spasticity are at high risk of developing contractures. Early treatment is key to preventing this disabling complication.

RECOMMENDATIONS

1. Recommend that spasticity and contractures be treated with antispastic positioning, range of motion exercises, stretching, splinting, serial casting, or surgical correction.
2. Consider use of tizanidine, dantrolene, and oral baclofen for spasticity resulting in pain, poor skin hygiene, or decreased function. Tizanidine should be used specifically for chronic stroke patients (refer to Section IV-O).
3. Recommend against diazepam or other benzodiazepines during the stroke recovery period due to possible deleterious effects on recovery (refer to Section IV-O), in addition to deleterious sedation side effects.
4. Consider use of botulinum toxin or phenol/alcohol for selected patients with disabling or painful spasticity or spasticity resulting in poor skin hygiene or decreased function.
5. Consider intrathecal baclofen for chronic stroke patients for spasticity resulting in pain, poor skin hygiene, or decreased function.
6. Consider neurosurgical procedures, such as selective dorsal rhizotomy or dorsal root entry zone lesion, for spasticity resulting in pain, poor skin hygiene, or decreased function.

DISCUSSION.

Spasticity is defined as velocity-dependent hyperactivity of tonic stretch reflexes. It is 1 of the most important impairments for patients after stroke, and can result in significant pain and functional disturbances. The most impairing state from spasticity may be contractures, rendering the affected limb functionless. Skin hygiene may also be a problem with spasticity.

Spasticity is typically treated in a stepwise approach, beginning with the least-invasive modalities and progressing to more invasive. Positioning, passive stretching, and range of motion exercise may provide relief, and should be done several times daily in persons with spasticity. Corrective measures for contractures that interfere with function include splinting, serial casting, or surgical correction. No reliable data exist comparing different physical therapy interventions, with or without antispastic medications.

Tizanidine, baclofen, dantrolene, and diazepam are FDA-approved oral medications in the United States for the treatment of spasticity. There is limited evidence from controlled trials of spasticity treatment in stroke patients, and the conclusions of the majority of these trials were that spasticity and pain may be reduced but that no significant functional gains were made. Tizanidine has been shown to have efficacy in chronic stroke patients with improvement in spasticity and pain without loss of motor strength, in an open-label dose titration study.¹⁶⁰ Dantrolene has limited trial data to support its use in stroke and cited benefits of no cognitive side effects.¹⁶¹ Katrak et al¹⁶² found that starting patients on Dantrolene Sodium early after a stroke, before the onset of disabling spasticity, produced no change in clinical tone or functional outcome. Oral baclofen has some data to support its use in stroke.¹⁶³ Reportedly, oral baclofen may cause significant sedation and have less impact on spasticity in stroke victims, in comparison to other disease conditions.¹⁶⁴ Diazepam is relatively contraindicated in stroke patients, at least in the stroke recovery period, as reviewed in Section IV-O.

Several procedures exist for the treatment of spasticity. Phenol/alcohol neurolysis has been effective in reducing spasticity,¹⁶⁵⁻¹⁶⁷ but is an invasive procedure with an irreversible therapeutic action and potential notable side effects. Both the AHCP⁹ and RCP guidelines¹¹ support the use of botulinum toxin injections for selected patients with spasticity due to stroke. A number of double-blind placebo-controlled, randomized trials of high quality have been published since the guideline reports. These trials confirm the effectiveness of botulinum toxin injections in producing short-term improvements as noted by patients and their caregivers and in decreasing spasticity in a small select group of patients. However, no evidence was found to suggest that the use of EMG guidance improves outcomes from the botulinum toxin injection therapy.¹⁶⁸ Botulinum toxin has several evidence-based indications with regard to effective treatment of spasticity and functional benefits in nonstroke conditions.¹⁶⁹⁻¹⁷¹ No additional RCTs have been published since the RCP guideline that addressed the addition of electrostimulation to botulinum injections.

Intrathecal baclofen has been demonstrated to reduce spasticity in a small trial of chronic stroke patients (with stroke onset >6 months previous

